



Public Workshop to Discuss Reducing Emissions from In-Use Commercial Harbor Craft

Emission Reduction Strategies for Commercial Harbor Craft

March 23, 2004

California Environmental Protection Agency

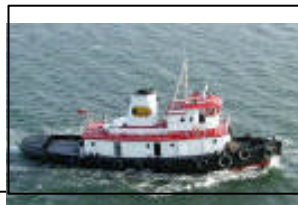


Air Resources Board

Possible Emission Reduction Strategies for NO_x and PM

Fuels

- Cleaner diesel
- Alternative diesel fuels
- Alternative fuels
- Fuel/water blends



Control Technologies

- DOC, DPF, SCR
- Engine modifications
- Repower

Operational Changes

- Cold Ironing
- Reduce Idling

Fuels

Clean Fuel Options

- Cleaner Diesel
- Alternative Diesel Fuels
 - Fischer-Tropsch
 - Biodiesel
- Alternate Fuels
 - Natural Gas
- Fuel/Water Blends



Clean Fuel Issues

- Availability
- Cost
- Compatibility
- Infrastructure
- Safety
- Verification

Effectiveness of Control Technologies



Effectiveness	PM Reductions	NOx Reductions
Diesel Particulate Filters	✓ 90%	
Diesel Oxidation Catalysts	✓ 30%	
NOx Adsorbers, Lean NOx Catalysts		✓ 20-50%
Selective Catalytic Reduction		✓ 90%
Engine/Combustion Modifications	✓ May affect NOx	✓ May affect PM
Repower	✓	✓

Comparative Costs of Control Technologies



Comparative Costs	PM Reductions	NOx Reductions
Diesel Particulate Filters	✓ Higher	
Diesel Oxidation Catalysts	✓ Lower	
NOx Adsorbers, Lean NOx Catalysts		✓ Lower
Selective Catalytic Reduction		✓ Higher
Engine/Combustion Modifications	✓ Lower	✓ Lower
Repower	✓ Higher	✓ Higher

Control Technologies - Issues



Control Technology Issues

- Effectiveness
- Availability
- Cost
- Compatibility
- Emission Reduction Verification

Operational Changes



Options

- Cold Ironing/ shore power
- Reduce idling

Operational Issues

- Infrastructure
- Availability
- Cost
- Compatibility
- Safety

Emission Reduction Strategies for Commercial Harbor Craft

